NON-PUBLIC?: N
ACCESSION #: 9209150332
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Nine Mile Point Unit 1 PAGE: 1 OF 05

DOCKET NUMBER: 05000220

TITLE: Reactor Scram Due to Failure of LPRM Detector
EVENT DATE: 08/07/92 LER #: 92-009-00 REPORT DATE: 09/08/92

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 076

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: R. Tessier, Manager Operations NMP1 TELEPHONE: (315) 349-2707

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: AC COMPONENT: RI MANUFACTURER: W120
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On August 7, 1992 at 0413 hours with the mode switch in the "RUN" position and reactor power at approximately 76 percent, Nine Mile Point Unit 1 (NMP1) experienced a Reactor Protection System (RPS) actuation. Specifically, this was a full reactor scram caused by a spurious spike on a Local Power Range Monitor (LPRM), while a half scram was manually inserted on the opposite RPS channel for testing. The spurious LPRM spike caused Average Power Range Monitor (APRM) 16 to reach its upscale scram setpoint. Following the scram, High Pressure Coolant Injection (HPCI) initiated on low reactor water level, as expected.

The cause of the LPRM spike is a failure of either the LPRM detector or the associated cable connector. A single LPRM upscale spike may cause the APRM to trip upscale when the APRM is near its scram setpoint.

Corrective actions were to stabilize and cooldown the reactor in accordance with plant procedures and to bypass the defective LPRM from

the APRM averaging circuit as allowed by plant Technical Specifications.

END OF ABSTRACT

I. DESCRIPTION OF EVENT

On August 7, 1992 at 0413 hours with the mode switch in the "RUN" position and reactor power at approximately 76 percent, Nine Mile Point Unit 1 (NMP1) experienced a Reactor Protection System (RPS) actuation. Specifically, this was a full reactor scram caused by a spurious spike on a Local Power Range Monitor (LPRM), while a half scram was manually inserted on the opposite RPS channel for testing. The spurious LPRM spike caused Average Power Range Monitor (APRM) 16 to reach its upscale scram setpoint. Following the scram, High Pressure Coolant injection (HPCI) initiated on low reactor water level, as expected.

NMP1 has eight APRMs (four in each of two RPS channels, #11 and #12). Each APRM has eight LPRM inputs. Prior to the full scram, a half scram had been initiated manually on RPS channel 11 for testing per NMP Procedure N1-ST-Q7, "Manual Scram Instrument Channel Test." One minute after the manual half scram was inserted, LPRM 20-49D spiked upscale, causing APRM 16 (RPS channel 12) to trip, resulting in a full reactor scram. This LPRM had spiked upscale approximately four hours prior to this event, but had not caused APRM 16 to trip. At this earlier time, there was more margin to the APRM scram setpoint due to the power ascension in progress. LPRM 20-49D was not bypassed at that time because previous operational policy was to observe the LPRM for a period of time (as long as half scrams are not being generated) and bypass the detector only if continued spiking occurred or if any half scrams resulted.

Following the scram signal, all control rods inserted to position 00. The turbine tripped five seconds after the scram signal, and the generator tripped five seconds after the turbine trip, as expected. HPCI initiated on low reactor water level following the scram, as expected. However, Feedwater Pump (FP) 12 tripped on low suction pressure during its initiation in the HPCI mode. FP #11 and the coastdown flow of FP #13 brought reactor water level up to approximately +98 inches (scale). The lowest water level reached was +16 inches (scale).

II. CAUSE OF EVENT

The cause of the scram was failure of LPRM 20-49D. This LPRM had been in service for eight years with no history of spiking upscale or any other type of problems. It was already scheduled to be replaced during the

next refuel outage because it will reach its end of life. Following startup, after the scram, this detector continued to spike upscale. Testing on the detector, subsequent to the event, has revealed that the detector prematurely breaks down during voltage-current (V/I) curve testing. Thus, the failure may be attributable to a damaged connector under the reactor vessel or actual break down of the detector itself.

Contributing factors to the cause of the scram were the performance of half scram testing on one channel of RPS while a detector had spiked recently (four hours earlier) on the opposite channel of RPS. If LPRM 20-49D had been taken out of service immediately upon detection of the upscale spike, the full reactor scram would not have occurred.

III. ANALYSIS OF EVENT

This event is reportable in accordance with 10CFR50.73 (a)(2)(iv), "any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)."

The initiation of the flow-biased APRM scram and HPCI system are protective modes of operation, and they performed their intended functions. The flow biased APRM scram is an automatic Reactor Protection System action to prevent exceeding a fuel cladding safety limit. The integrity of the fuel clad as a barrier to the release of fission products is assured if the corresponding fuel clad safety limit is not exceeded. In this event, actual neutron flux level did not increase. The scram was caused by failure (spiking) of the LPRM.

HPCI initiation on low reactor water level performed its function of providing adequate cooling to the reactor core. Prior to the scram, FP 13 (the main, turbine-shaft driven feedwater pump) was providing feedwater flow to the reactor, and FPs 11 and 12 (the electric motor driven feedwater pumps) were in standby. Four (4) condensate demineralizers were in service, which was sufficient to provide the necessary feedwater flow for operation. After the scram, the turbine trip caused FP 13 to coastdown along with the turbine. The level shrink caused by the reactor scram caused FPs 11 and 12 to initiate in the HPCI mode. With only 4 condensate demineralizers in service and the increased feedwater flow, a low pressure condition resulted at the suction of the FPs. FP 12 tripped on low suction pressure, which cleared the low suction pressure condition. FP 11 remained running because the low pressure cleared before the pump could trip. With FP 12 tripped, the total feedwater flow to the reactor vessel was still considerably greater

than the minimum required HPCI flow. FP 12 performed within its design basis when it tripped on low suction pressure.

Throughout the event, adequate cooling was provided for the reactor core.

There were no adverse safety consequences as a result of this event, nor was the reactor in an unsafe condition during or after this event. There were no adverse consequences to the health and safety of the general public or plant personnel as a result of this event.

IV. CORRECTIVE ACTIONS

Short term corrective actions were:

1. Stabilized and cooled down the reactor in accordance with plant procedures.

2. Time domain reflectrometry testing was performed on LPRM detector 20-49D's cable to check continuity. Testing revealed no problems with the cable or connectors.

IV. CORRECTIVE ACTIONS (cont.)

3. Voltage-current curve testing was performed on LPRM detector 20-49D.

The testing revealed that the detector prematurely breaks down. The detector was bypassed from APRM 16, as allowed by Technical Specifications.

4. Initiated an individual LPRM spiking/upscale trip log to help trend spiking problems.

5. Issued a Lessons Learned Transmittal to Operations and Reactor Engineering personnel to discuss this event and emphasize the importance of bypassing LPRMs which are susceptible to spiking if Technical Specifications permits.

6. Deviation/Event Report (DER) # 1-92-3178 and Work Request #W205358 were written and dispositioned to address the trip of FP #12 in the HPCI mode. The disposition noted that the pump tripped due to low suction pressure. The cause of the low suction pressure was that FP #13 (turbine shaft driven, main feed pump) was coasting down after the turbine trip, FPs 11 and 12 were operating in the HPCI mode, and four condensate demineralizers were in service. With only four

condensate demineralizers in service and the increased feedwater flow, a low pressure condition resulted at the suction of the FPs. The suction pressure switch, auxiliary lube oil pump, and the feedpump oil pressure start permissive switch were tested and found to be acceptable. The feedwater pump started when tested after troubleshooting.

Long term corrective actions are:

1. Replace LPRM string #20-49 during the next refueling outage.

2. Verify cable/connector operability during the next refueling outage.

3. Investigate and evaluate operating recommendations relative to the number of condensate demineralizers in service.

V. ADDITIONAL INFORMATION

A. Failed components: Local Power Range Monitor.

B. Previous similar events: none.

V. ADDITIONAL INFORMATION (cont.)

C. Identification of components referred to in this LER:

COMPONENT IEEE 803 FUNCTION IEEE 805 SYSTEM ID

Reactor Protection System N/A JC

High Pressure Coolant Injection
System N/A BJ

Average Power Range Monitor RI AC

Feedwater Pump P SJ

Local Power Range Monitor RI AC

NIAGARA
MOHAWK

NINE MILE POINT NUCLEAR STATION/P.O. BOX 32, LYCOMING, N.Y 13093/
TELEPHONE (315) 349-2447

Neil S. "Buzz" Carns
Vice President September 8, 1992
Nuclear Generation NMP87264

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

RE: Docket No. 50-220
LER 92-09

Gentlemen:

In accordance with 10CFR50.73, we hereby submit the following Licensee Event Report:

LER 92-09 Is being submitted in accordance with 10CFR50.73 (a)(2)(iv), "any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF) including the Reactor Protection System (RPS)."

This report was completed in the format designated in NUREG-1022, Supplement 2, dated September 1985.

A 10CFR50.72 report was made on August 7, 1992 at 0437 hours.

Very truly yours,

Mr. N. S. Carns
Vice President - Nuclear Generation

NSC/JPT/lmc
ATTACHMENT

pc: Thomas T. Martin, Regional Administrator
Wayne L. Schmidt, Senior Resident Inspector

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